nti NTARC

MAJOR CRASH INVESTIGATION 2022 REPORT

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FOREWORD

2021 saw the second year of the COVID-19 pandemic, with the Transport Industry continuing to play a pivotal role in the lives of all Australians by providing an ongoing, essential service. This allowed us to enjoy full supermarket shelves, parcel deliveries to our homes, and more, while many Australians endured lockdowns.

The way that the industry soldiered on with professionalism and commitment, even while many faced their own pandemic challenges at home, is a testament to the people and businesses that truly are the backbone of our nation.

While the data from this report continues to highlight a number of positive trends, it also reminds us of the need to support and protect the industry's greatest asset – its people. Grouped together for the first time in this report, "human factors" were found to be responsible for nearly two out of every three serious crashes. While this figure is similar to the results seen in the 2021 Report, it reminds us of the opportunities we have to better integrate technology, driver wellbeing initiatives and workplace culture improvements into transport businesses. NTI will continue to work with industry to advance these discussions.

The Major Accident Investigation Report has been released by NTI since 2005. Looking back on the trends over this time shows just how far the industry has come – and also highlights the importance of using data to generate and inform conversation and change. Since the inaugural report in 2005:

- Fatigue and inappropriate speed have reduced from being responsible for over 57% of serious truck crashes to under 21% in this report.
- Fatigue reforms in 2008 saw fatigue-related incidents drop from over 27% to just 10% of major crashes. This figure has remained low at 8.2% in this report.
- Inappropriate speed as the dominant accident cause reached a peak of 31.8% in 2009. This is now at a record low of 12.5% in 2021.

While much of society is returning to "normal" as we learn to live with COVID-19, the industry is faced with the opportunity to continue improving its approach to safety – not only for the welfare of current and future transport operators, but for all road users.

Thank you to all who have played a role in creating this important report.

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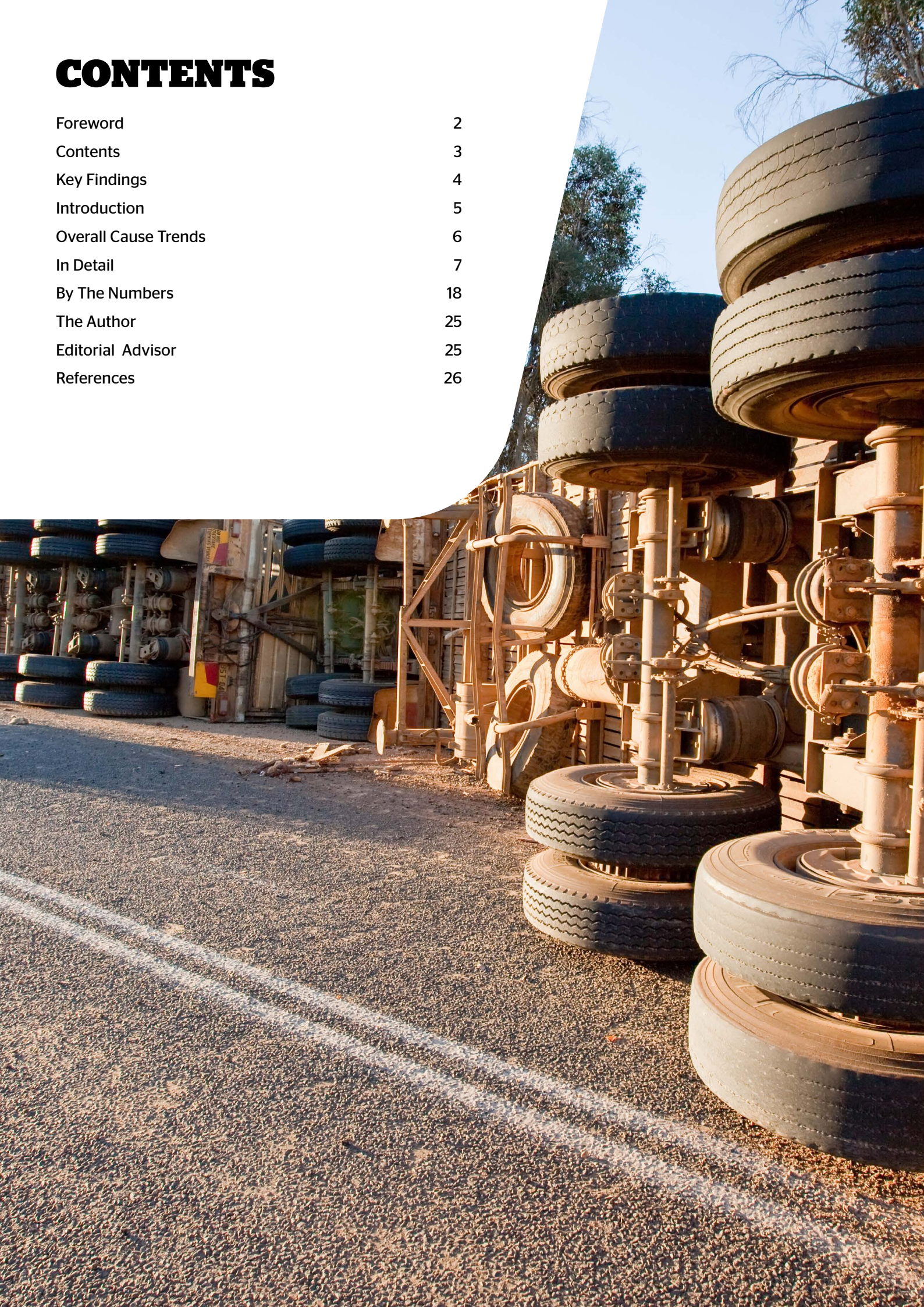


KEY FINDINGS

1 In 2021 the overall frequency of serious truck crashes increased slightly from a Covid-19 related low in 2020, however did not return to pre-pandemic levels

2 The proportion of serious crashes attributed to human-factor related causes continued a trend of increasing year-on-year to reach 63.5% of all losses

3 An increase in Driver Error losses from 40.6% in 2020 to 42.9% in 2021 was a significant contributor to an increase in the overall proportion of losses due to 'human factors'.

4 At 8.2%, the proportion of losses due to fatigue remained largely consistent with the proportion seen in 2020 (8.0%), which represents a significant improvement when compared to earlier years.

INTRODUCTION

2021 marked a significant milestone for the NTARC with 1001 incidents. This increase in sample size is driven by a combination of strong growth in NTI's insured portfolio and the impact of inflation increasing the proportion of claims which exceed the fixed $50,000 threshold.

Incidents in NTARC data set

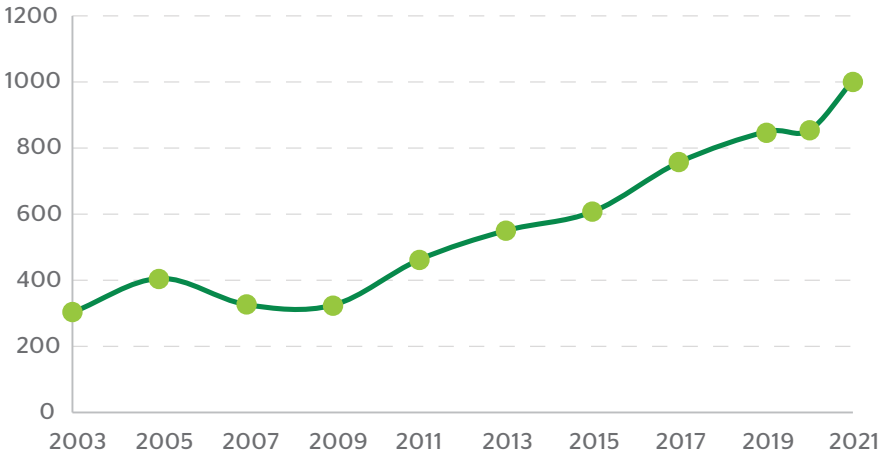


Figure 1 - Number of incidents in NTARC report by year

After a sharp decline corresponding to the Covid-19 pandemic, the overall frequency of large losses within NTI's portfolio increased slightly in 2021, however when measured over the course of the year did not return to pre-pandemic levels.

Large loss frequency corrected for inflation

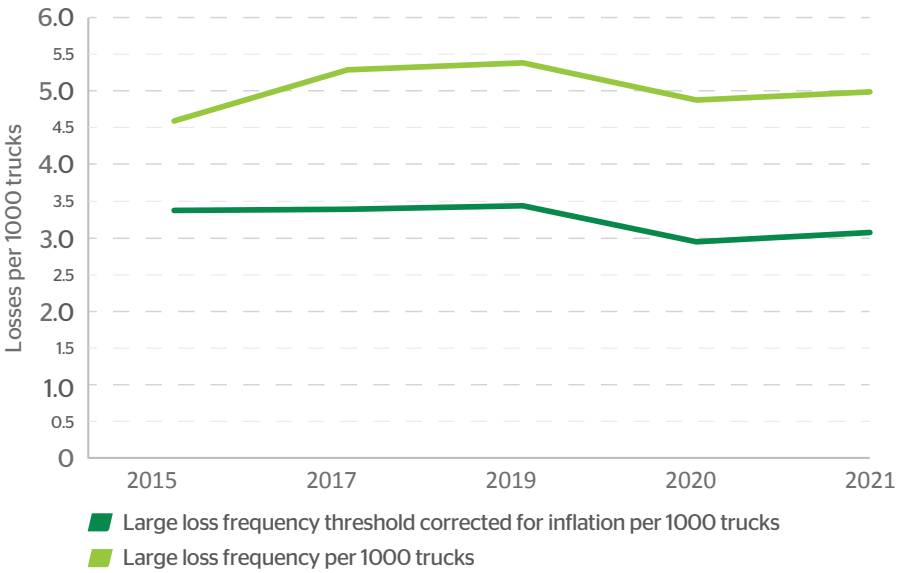
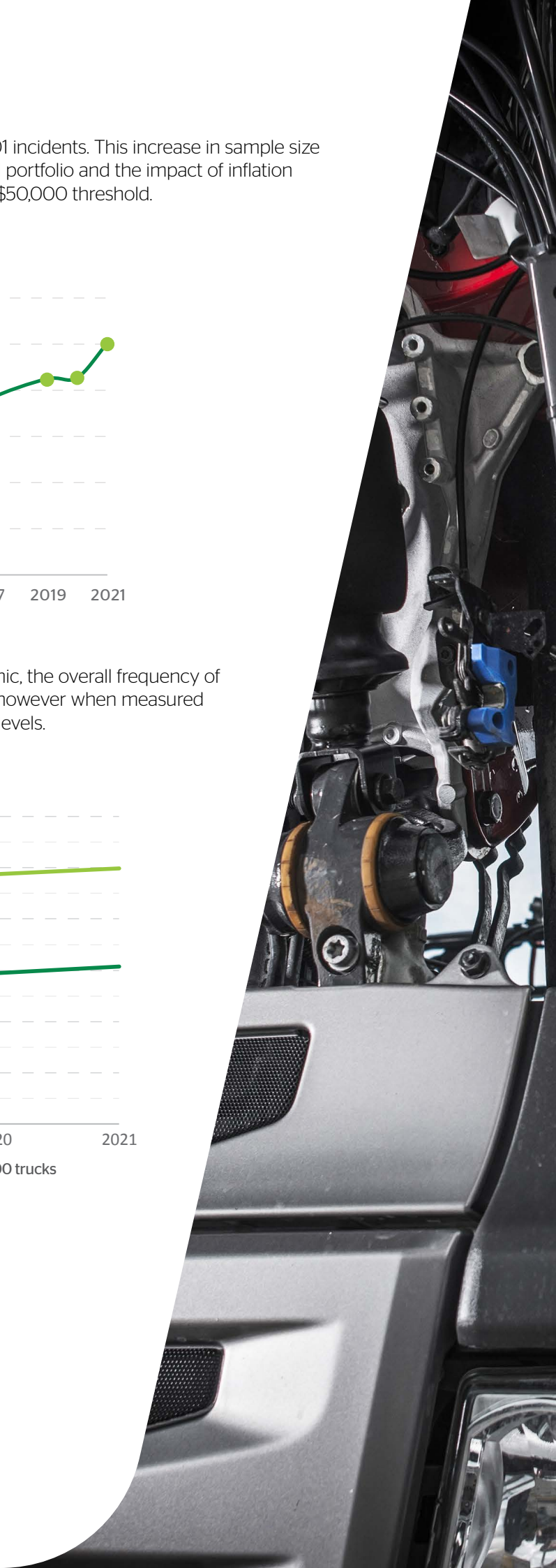


Figure 2 - Frequency of large losses by year



OVERALL CAUSE TRENDS

Review of the distribution of incident causes for 2021 reveals limited change when compared to prior years.

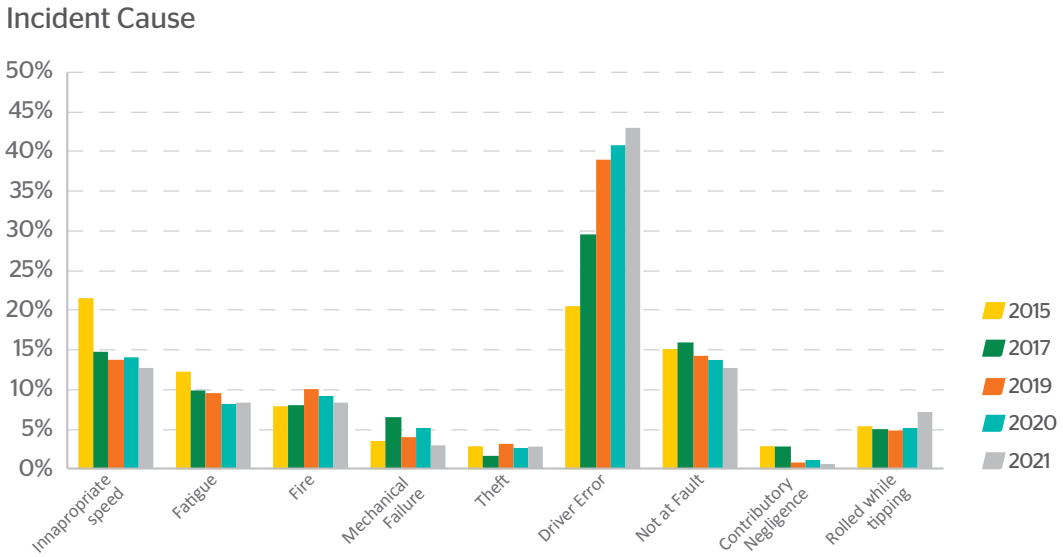
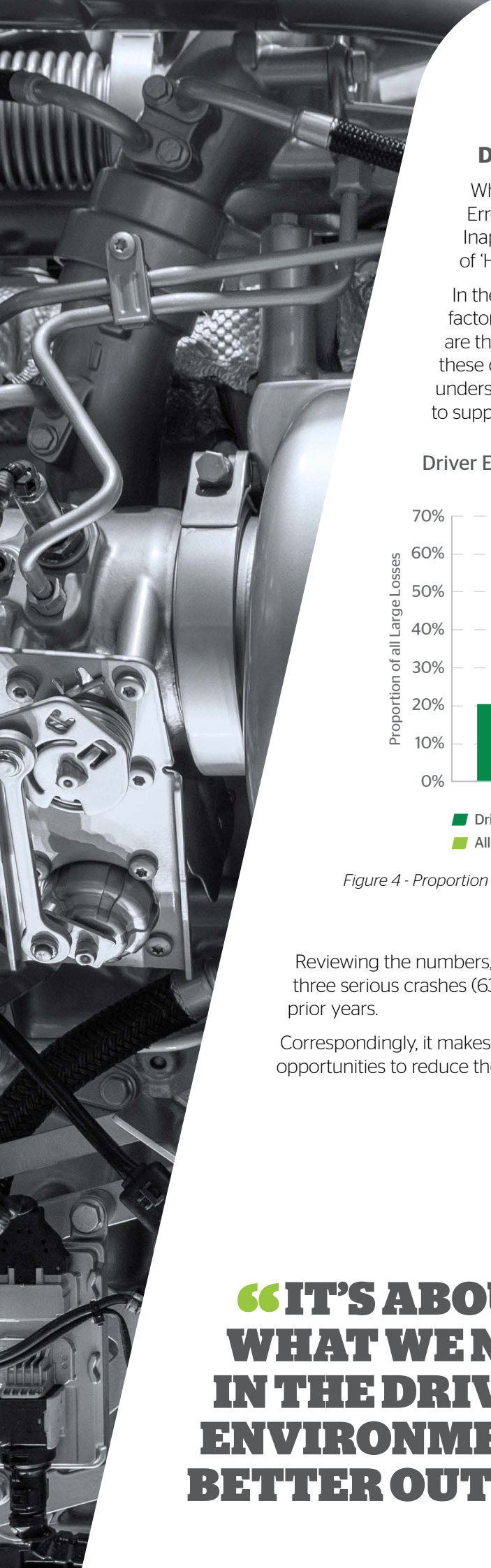


Figure 3 - Distribution of incident cause by year

There was an increase in Driver Error losses, this is consistent with the trend in 2019-onwards. Also observable in the cause trends was an increase in Rolled-while-tipping losses, which increased from 4.9% to 6.9% of NTI's large losses.

On the other side of the ledger, the proportion of NTI's large losses caused by inappropriate speed reduced from 13.8% to 12.5%, mechanical failure reversed an upwards trend in 2020 to fall to 2.8% and the proportion of large losses where the NTI-insured vehicle was not at fault fell one percentage point to 12.5%.



IN DETAIL

Driver Error / 'Human Factor' Losses

While the NTARC cause structure contains a category of 'Driver Error', for the purpose of analysis it is useful to group this along with Inappropriate Speed and Fatigue losses to create a broader category of 'Human Factor' crashes.

In these 'Human Factor' crashes the dominant proximate contributing factors and in turn the likely best nexus through which to drive change are the decisions made by individual drivers. It is important to note these categorisations aren't about attributing blame, but rather it's about understanding what we need to change in drivers' working environments to support better outcomes.

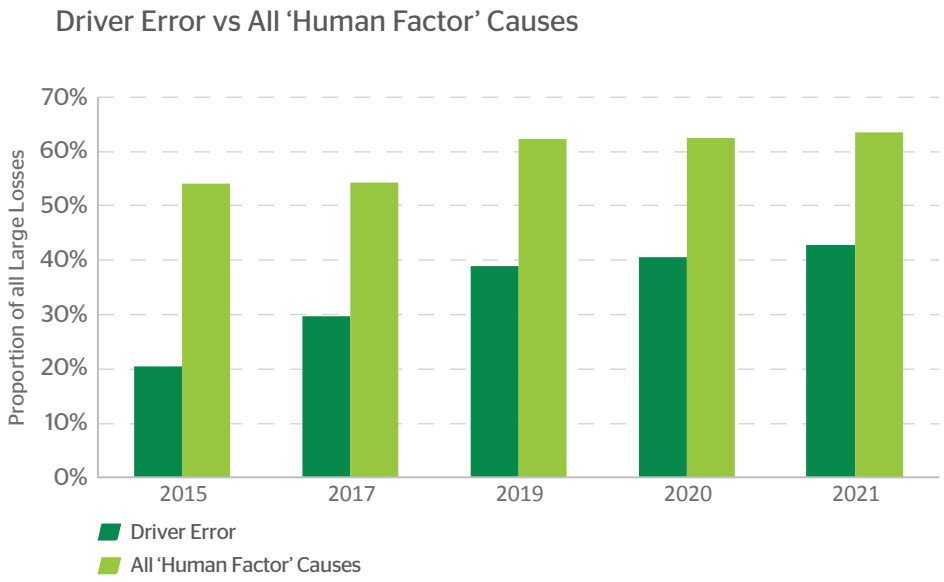


Figure 4 - Proportion of incidents due to driver error and human factors by year

Reviewing the numbers, 'Human Factor' crashes now represent nearly two out of every three serious crashes (63.5%), after an increase of just over one percentage point on prior years.

Correspondingly, it makes unpacking human factors crashes and identifying potential opportunities to reduce their frequency a key focus area for the road transport industry.

"IT'S ABOUT UNDERSTANDING WHAT WE NEED TO CHANGE IN THE DRIVER'S WORKING ENVIRONMENTS TO SUPPORT BETTER OUTCOMES"

‘Human Factors’ losses by Cause

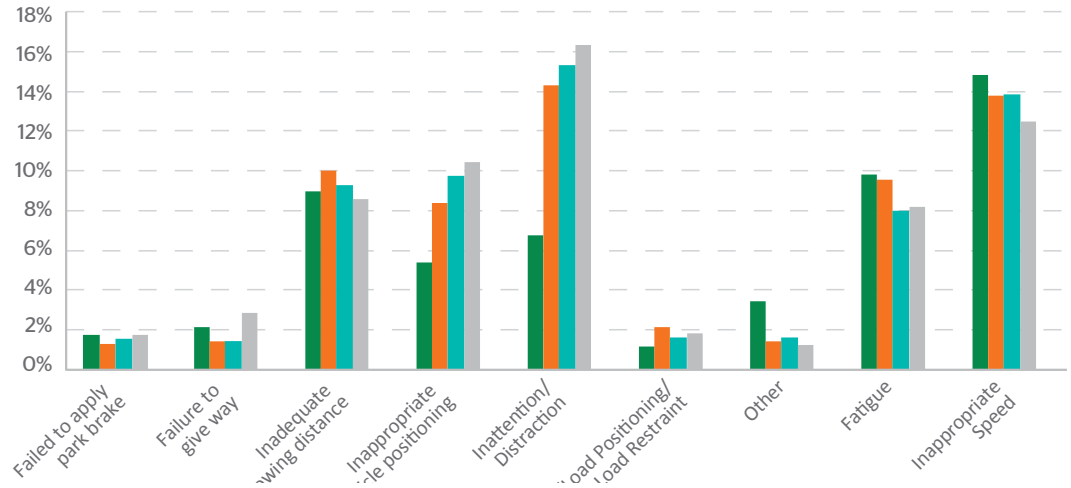


Figure 5 - Distribution of Human Factors by proportion of all incidents by year

As shown in Figure 5, the top five causes of ‘human factors’ crashes in were Inattention/Distraction (16.3%), Inappropriate Speed (12.5%), Inappropriate vehicle positioning (10.5%), Inadequate following distance (8.6%) and Fatigue (8.2%).

Of these, Inattention/Distraction and Inappropriate vehicle positioning show a trend of increasing over time, Inappropriate Speed and Inadequate following distance are trending downwards while Fatigue is largely stable compared to 2020 data.

Of the less prominent ‘human factors’ crashes, most were generally stable in 2021 with the exception of failure to give way crashes which doubled from 1.4% to 2.8% of all losses.

Inattention/Distraction

The proportion of NTI’s large losses resulting from driver Inattention/Distraction continued to increase in 2021, and is now the cause of almost one in six (16.3%) of all losses.

Inattention/Distraction

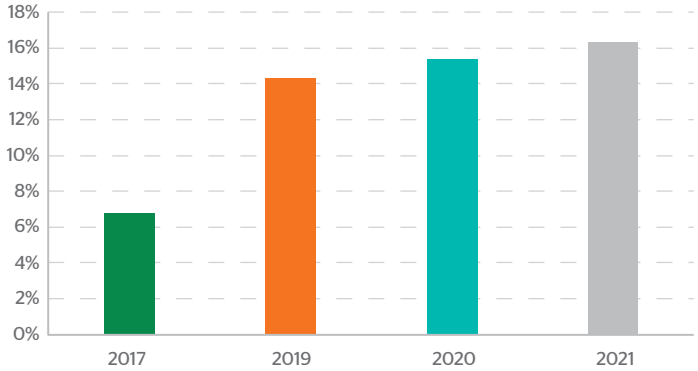
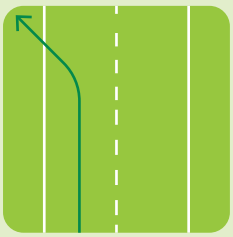


Figure 6 - Proportion of incidents due to Inattention/Distraction by year

Defined: - Inattention/Distraction

Inattention and Distraction crashes are a grouped pairing of crash causes where the incident is determined to be as the result of the driver becoming disengaged from the driving task as the result of either a specific non-driving related stimulus (Distraction) or due to a loss of task focus (Inattention).

The most common crash coding for Inattention/Distraction crashes was 'Off path on straight', with this being the recorded mechanism for 36.8% of Inattention/Distraction crashes, compared to 20.5% of all crashes



Crash Mechanism Coding – Off Path on Straight

All Crashes: **20.5%**

Inattention/Distraction: **36.8%**

The second most common mechanism for Inattention/Distraction crashes was 'Vehicles from same direction' (25.2%), for context this mechanism accounts for 18.1% of all crashes.

The distribution of Inattention/Distraction crashes across the ABS remoteness area structure was generally quite consistent with those for all crashes, suggesting that geographical remoteness does not significantly influence driver Inattention/Distraction.

Similarly, the distribution by time of day for of Inattention/Distraction crashes is generally consistent with that for all losses.

Inattention/Distraction and All Losses by time of day

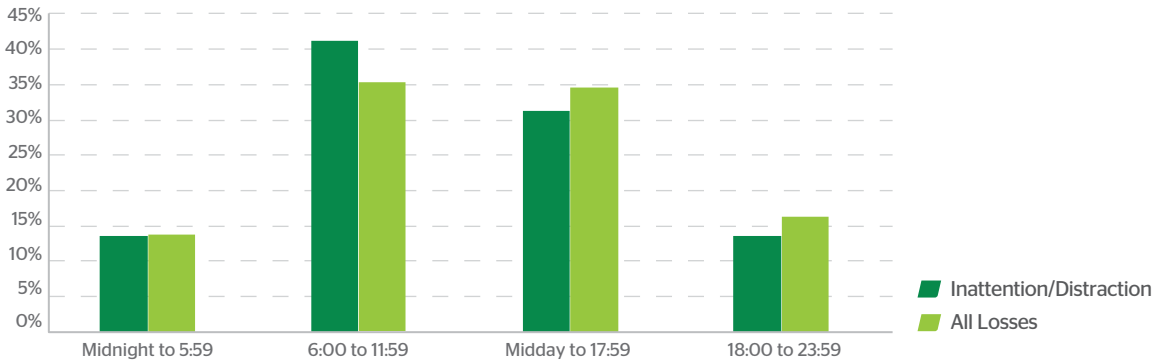


Figure 7 - Distribution of Inattention/Distraction and All Losses by time of day

Inappropriate Speed

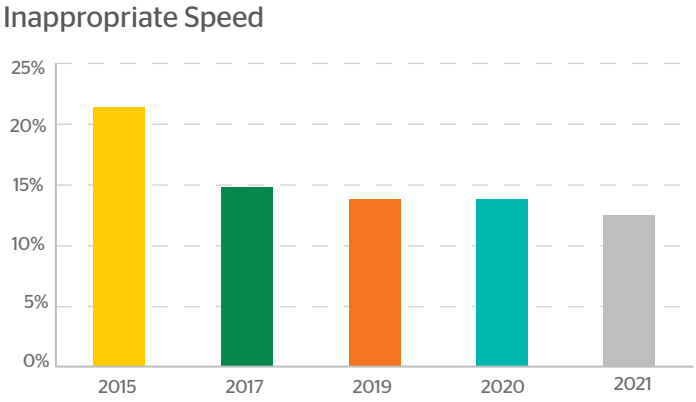
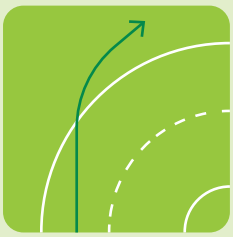


Figure 8 - Proportion of incidents due to Inappropriate Speed by year

After consistent figures (13.8%) in 2019-2020, there was a slight decline in the proportion of losses attributed to inappropriate speed in 2021, with this cause dropping to 12.5% of all losses.



Crash Mechanism Coding – Off Path on Curve

All Crashes: **29.9%**

Inappropriate Speed: **59.4%**

Reviewing the incident coding reveals that off path on curve crashes are the most common mechanism for incidents resulting from inappropriate speed.

These incidents most commonly take the form of single-vehicle 'untripped' rollovers, meaning our insured vehicle rolls due to the combination of centre of gravity and speed initiating the crash event, as distinct from where a rollover occurs as a subsequent outcome of the vehicle leaving the road.

The high proportion of rollover crashes also likely contributes to Inappropriate Speed crashes being a leading cause of truck occupant fatalities. As crashes where the truck or prime mover does not remain upright increases the likelihood of damage to the occupant survival space.

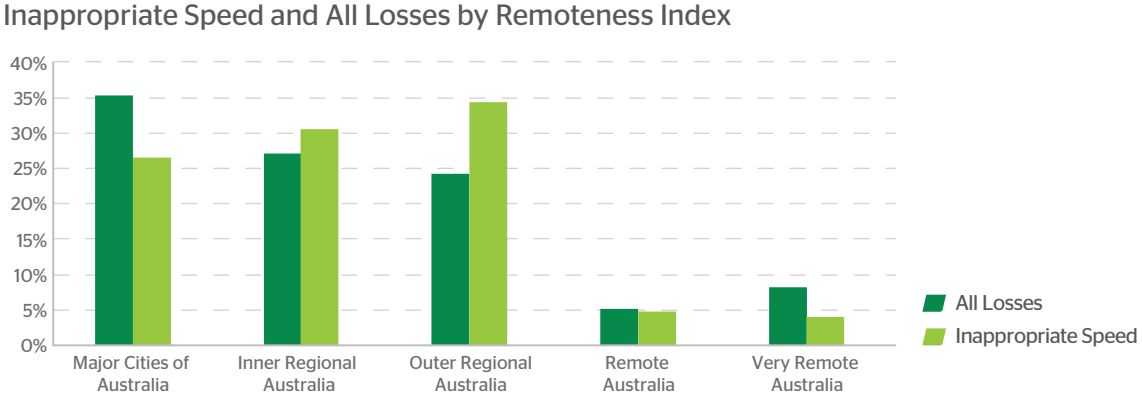


Figure 9 - Inappropriate Speed and All Losses by Remoteness Index

Defined: - Inappropriate Speed

Where the proximate cause of the crash was that the speed of the vehicle was incompatible with the vehicle dynamics, road geometry and/or prevailing weather and road conditions.

IMPORTANT NOTE: This is not about trucks exceeding the posted speed limit.

Examining the distribution of losses by remoteness index shows that outer-regional Australia, at 34.5% of losses, is over-represented by 42% when compared to the distribution of all large loss incidents (24.2%).

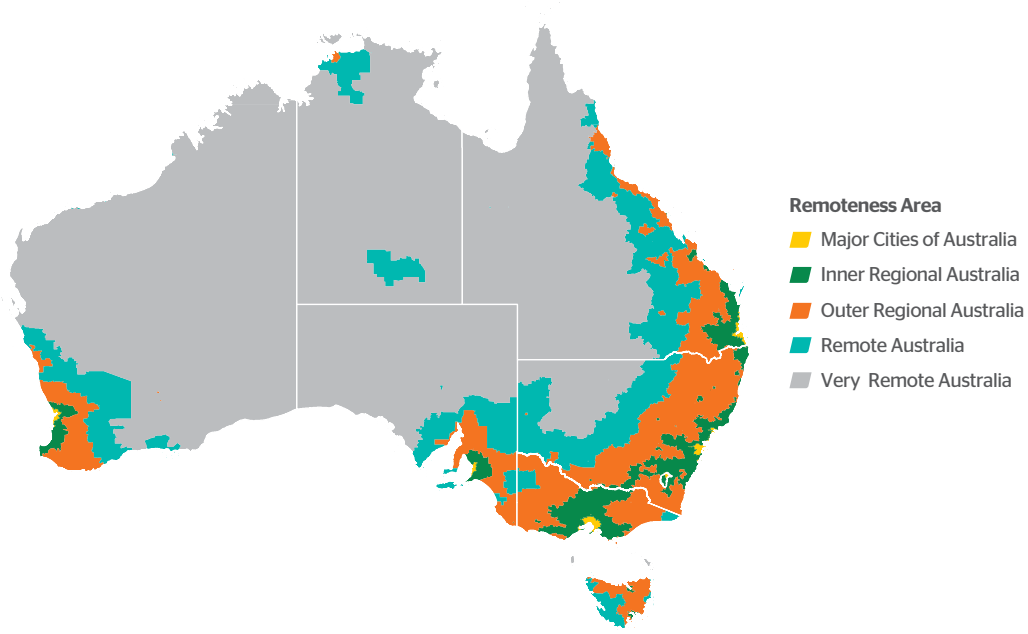


Figure 10 - Map of Australia by Remoteness Index

The remoteness classification of Major Cities is correspondingly under-represented. This reflects the nature of these crashes, being more likely to occur on open roads at higher travel speeds.

Inappropriate Speed and All Losses by Posted Speed Limit

(excludes <50km/h, other, not applicable and unknown speed zone)

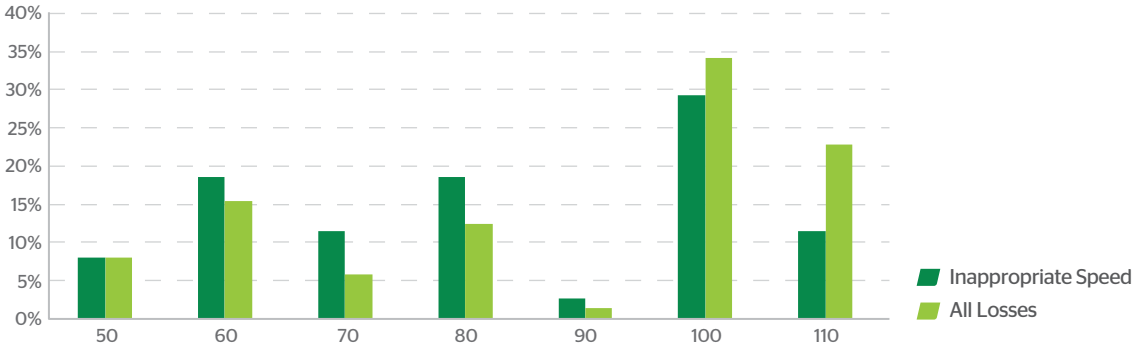


Figure 11 - Inappropriate Speed and All Losses by Posted Speed Limit

Review of the posted speed limits at the crash scene for Inappropriate Speed crashes in comparison to all losses show that 60 to 80km/h speed zones are over-represented, while a smaller proportion of inappropriate speed crashes occur in higher speed zones compared to the distribution for all loss types.

Viewing the data on speed zone and remoteness area together suggests the greatest risk is neither on urban roads with low travel speeds nor on the long straight sections of the national highway network, but rather on secondary routes with more challenging road geometry.

Inappropriate vehicle positioning

In 2021 losses caused by Inappropriate vehicle positioning continued the trend of increasing over time, from 9.7% in 2020 to 10.5% in 2021.

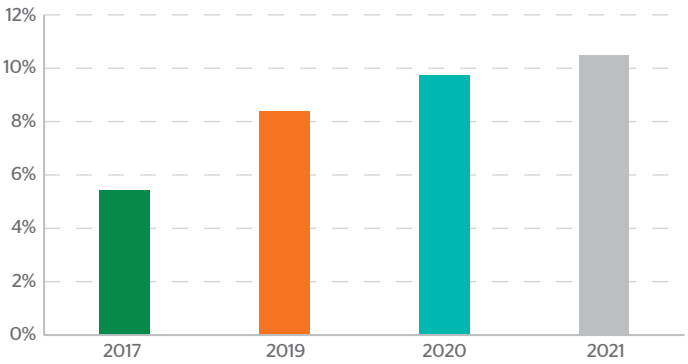
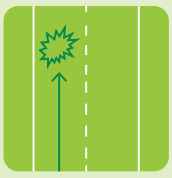


Figure 12 - Proportion of losses due to Inappropriate vehicle positioning by year

Inappropriate vehicle positioning crashes have quite a different profile to other causes when viewed by crash mechanism. The leading crash coding of "Passenger and Miscellaneous" occurs at a rate reasonably consistent with the average of all loss types. However the second and third most common codings of "On Path" (26.9%) and "Manoeuvring" (17.3%) occur at much higher rates than all losses.

Crash Mechanism Coding – Inappropriate vehicle positioning

Passenger and miscellaneous



On Path

Manoeuvring

Inappropriate vehicle positioning	**27.9%**	**26.9%**	**17.3%**
All Losses	**29.9%**	**9.8%**	**2.9%**

When reviewed against remoteness index, the distribution of inappropriate vehicle positioning crashes closely matches that of all losses, suggesting that the operating environment is not a relevant consideration for this crash type.

Defined: - Inappropriate vehicle positioning

Where the driver of the vehicle has active control of the vehicle and causes the vehicle to interact with a hazard which is either known to the driver or readily apparent.

Common elements in Inappropriate vehicle positioning crashes include striking awnings and other structures, dropping into culverts, off weighbridges or otherwise failing to keep the vehicle on the roadway and rollovers as a result of ground movement during earthworks.

Inadequate following distance

The slight decline in Inadequate following distance losses seen between 2019 and 2020 continued into 2021, with the proportion of all large losses caused by Inadequate following distance dropping to 8.6%

Inadequate following distance

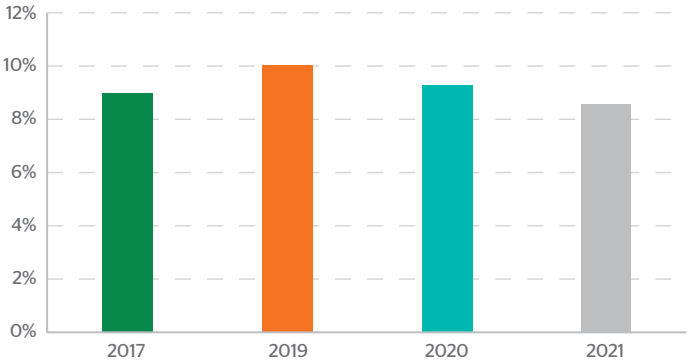
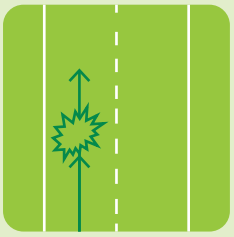


Figure 13 - Proportion of losses due to Inadequate following distance



Crash Mechanism Coding – Vehicles from same direction

All Crashes: **18.1%**

Inadequate following distance: **88.2%**

Review of the crash mechanisms for Inadequate following distance crashes shows the overwhelming majority are nose-to-tail crashes (88.2%) where our insured vehicle impacts the rear of vehicles ahead in traffic, with most of the remaining incidents (8.2%) being 'off path on straight' where our insured driver swerved off the roadway to avoid a collision.

Consistent with the involvement of other vehicles, Inadequate following distance crashes are heavily biased towards the Major Cities of Australia coding for remoteness index. The proportion of Inadequate following distance crashes occurring in Major Cities (71.8%) is twice that of All Losses (35.2%)

"THE SLIGHT DECLINE IN INADEQUATE FOLLOWING DISTANCE LOSSES SEEN BETWEEN 2019 AND 2020 CONTINUED INTO 2021"

Defined: - Inappropriate following distance

Where the driver of the vehicle has not maintained sufficient following distance to traffic in front and due to the lack of manoeuvring time/space an incident has occurred when something has disrupted traffic, such as vehicles ahead unexpectedly slowing

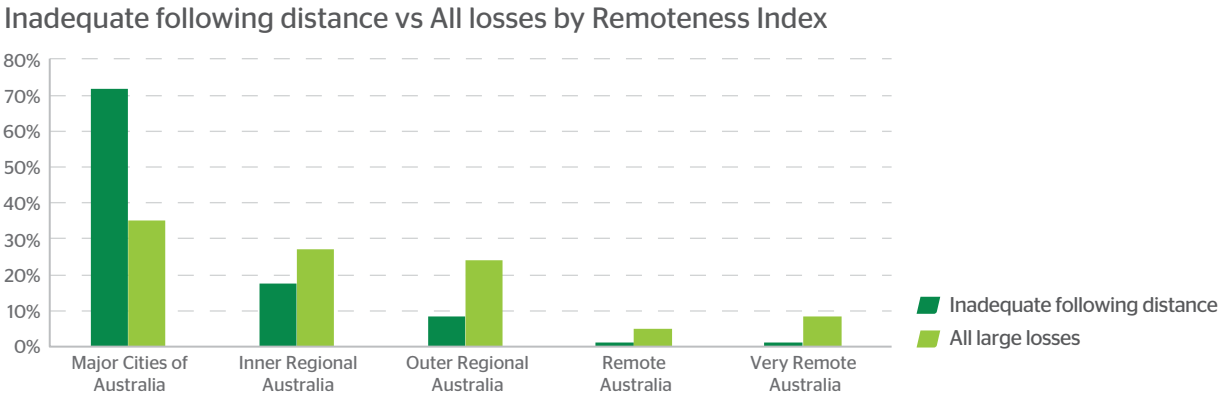
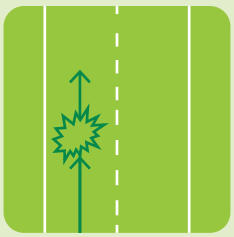


Figure 14 - Comparison of Inadequate following distance vs All Losses by Remoteness Index



Crash Mechanism Coding – Off Path on Straight

All Crashes: **20.5%**

Inadequate following distance: **77.8%**

Fatigue

After a drop from 9.6% in 2019 to 8.0% in 2020, there was a very slight increase to 8.1% for Fatigue crashes in 2021.

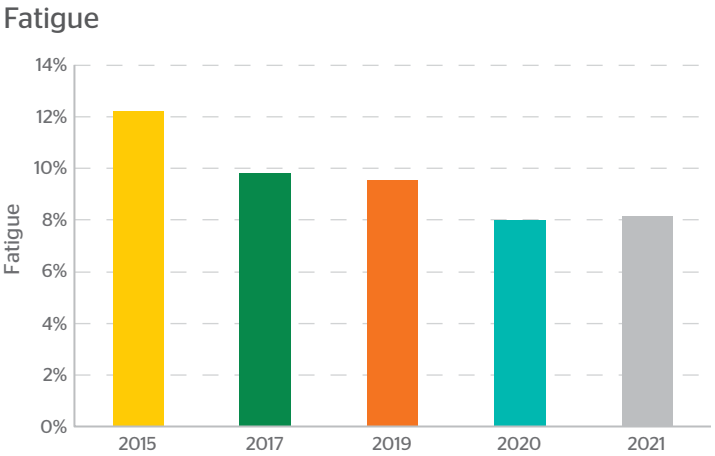


Figure 15 - Proportion of losses due to Fatigue

Consistent with prior years, a review of the crash mechanism for Fatigue crashes reveals a significantly higher rate of "Off Path on Straight" incidents, where our insured vehicle leaves an otherwise straight section of roadway.

The remoteness area reveals that there is a reasonably direct correlation between increasing remoteness and an increasing proportion of crashes as a result of Fatigue, with 8.2% of all large losses occurring in Very Remote Australia while 25.9% of Fatigue crashes occur in these regions.

Fatigue and All Losses by Remoteness Index

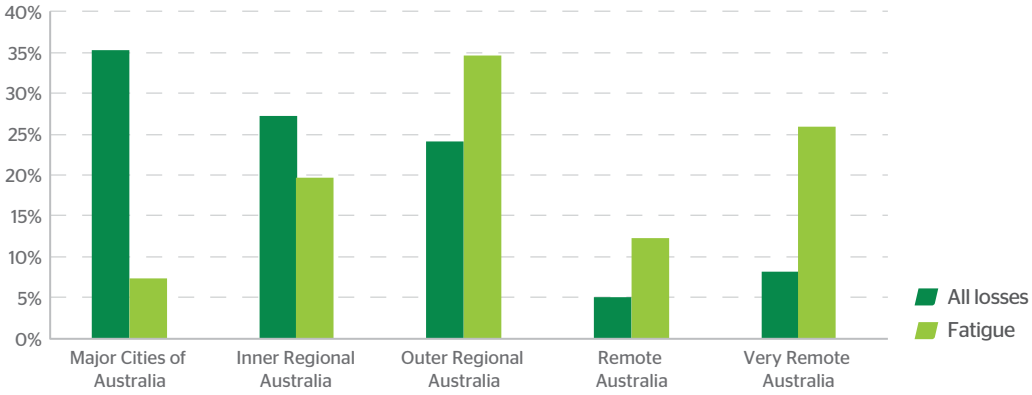


Figure 16 - Fatigue and All Losses by Remoteness Index

The largest proportion (38.3%) of Fatigue crashes occur between midnight and 6am, around double the proportion which occur in any other 6 hour period.

Fatigue Crashes by time of day by year

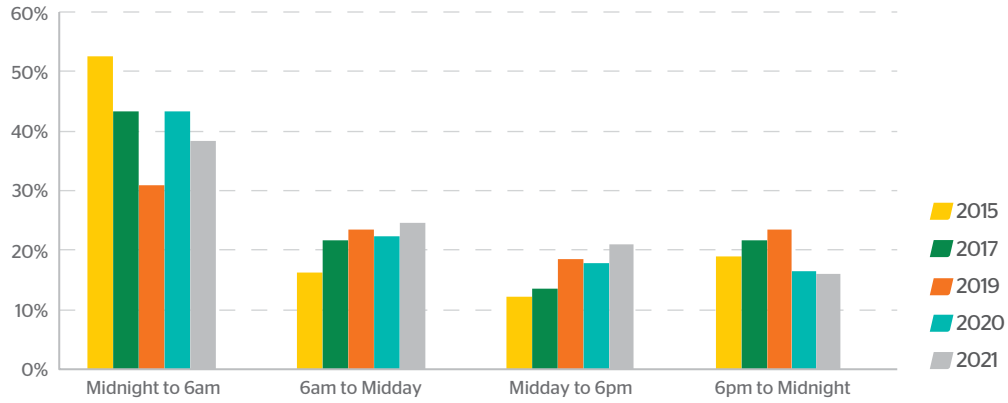


Figure 17 - Distribution of Fatigue Losses by time of day

When the relative proportion of traffic is considered, the situation is even more dramatic. Around one-tenth (9.4%) of daily truck movements occur during midnight to 6am, compared to around 40% through the middle of the day.

Defined: - Fatigue

Where the driver involuntarily disengages from the driving task due to impairment from lack of sufficient quantity and/or quality of rest.

IMPORTANT NOTE: This is not about driver compliance with work hour limits.

Distribution of Fatigue Crashes, HV Traffic and Fatigue Crash Risk by time of day

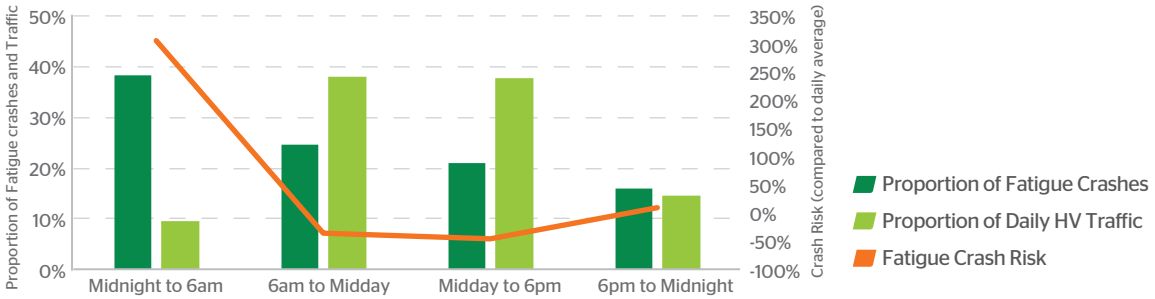


Figure 18 - Distribution of Fatigue crashes, HV traffic and Fatigue crash risk by time of day

Taking these lower traffic volumes into account, the likelihood that a truck on the road between midnight and 6am is involved in a Fatigue crash is around three times higher (306%) than the daily average.

Distribution of Fatigue vs All Losses by Day of Week

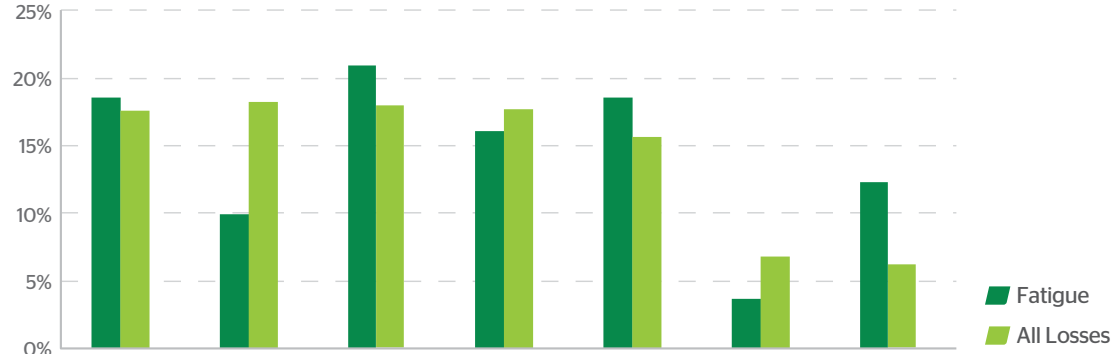


Figure 19 - Distribution of Fatigue vs All Losses by Day of Week

The distribution of fatigue losses by day of the week shows that Tuesday had a significantly lower proportion of Fatigue crashes in 2021 compared to either other days of the 'working' week and in comparison to the distribution of incidents for All Losses.

Using the distribution of all losses as a proxy for risk exposure, Sunday has a much higher proportion (203%) of the week's Fatigue (12.4%) losses than of all loss types (6.1%). Also with over-represented proportions of fatigue crashes were Wednesday and Friday, both which had a 17% larger proportion of the week's Fatigue crashes than of all losses.

Truck and Car Crashes

The proportion of not-at-fault fatal truck and car crashes has been a widely quoted statistic from the NTARC report. In 2021 this proportion decreased to trucks being not at fault in 70% of fatal truck and car crashes, this is the lowest in the history of recording this statistic however still reflects that in the significant majority of these crashes, the truck is not at fault.

Proportion Fatal Truck and Car Crashes which are not-at-fault

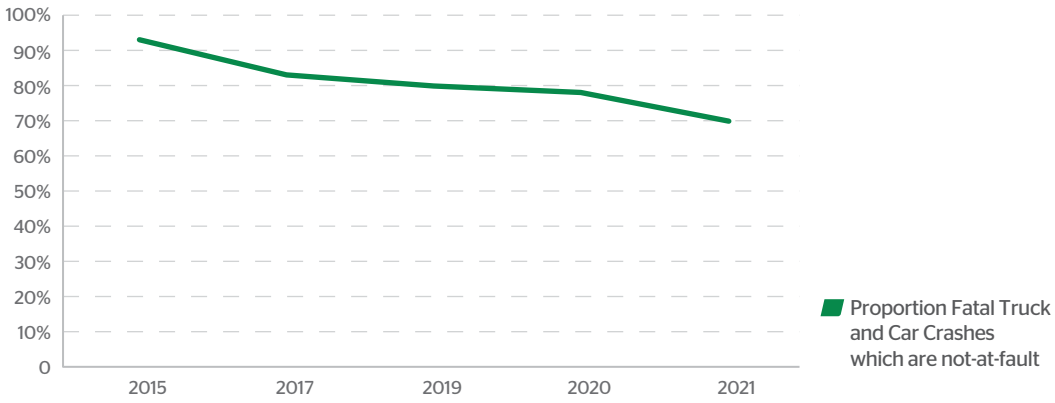


Figure 20 - Proportion of fatal truck and car crashes which are not-at-faul

By contrast the distribution of fault for non-fatal car and truck crashes remained consistent with prior years at 65.3%.

At fault party for non-fatal truck and car crashes

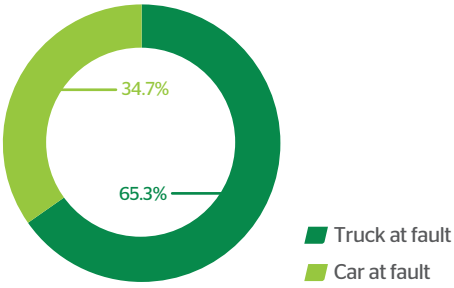


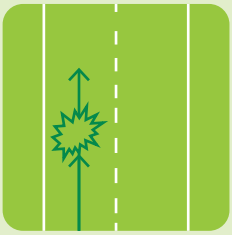
Figure 21 - At fault part for non-fatal truck and car crashes.

Likely contributing to the differences in crash outcomes are differences in the crash mechanism coding of truck-at-fault and car-at-fault crashes.

Most common mechanism for

Truck-at-fault

Vehicles from same direction



This mechanism accounts for:

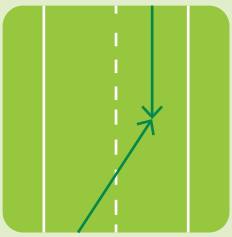
All truck-at-fault truck and car crashes:
68.0%

Fatal truck-at-fault truck and car crashes:
66.7%

Most common mechanism for

Car-at-fault

Vehicles from opposing direction



All car-at-fault truck and car crashes:
43.8%

Fatal car-at-fault truck and car crashes:
78.6%

While more than two-in-three truck-at-fault car and truck crashes are 'ran into rear' crashes, by contrast the most common mechanism for car-at-fault car and truck crashes are head-on crashes (43.8%), with the car crossing the centreline and impacting the truck. For fatal car and truck crashes, the proportion of incidents with this mechanism coding rises to 78.6%

The proportion of fatal truck and car crashes which were the result of intentional acts decreased from an elevated level in 2020 (43.5%) down to 37.5% which is more consistent with prior years. It remains likely that the higher proportion observed in 2020 resulted from a decrease in accidental crashes due to reduced light vehicle traffic volume during the Covid-19 pandemic.

Distribution of finding on intent in fatal truck and car crashes

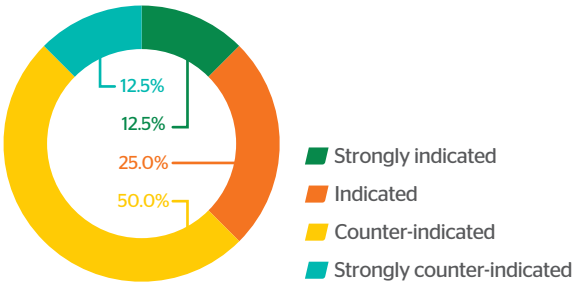


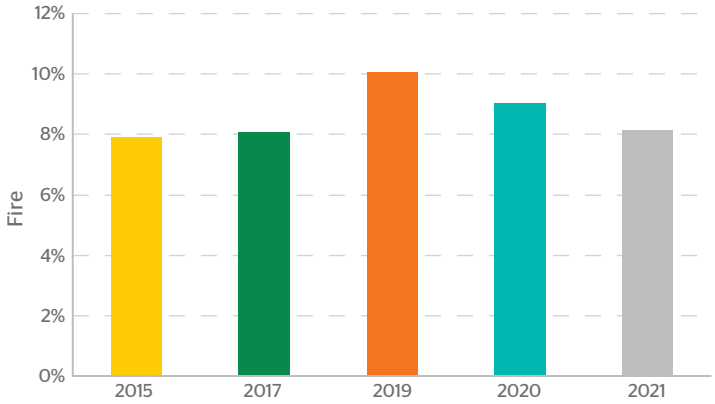
Figure 22 - Distribution of finding on intent in fatal truck and car crashes.

BY THE NUMBERS

Fire

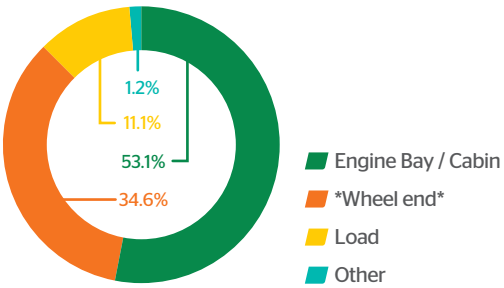
The proportion of Non-impact fire losses reduced slightly in 2021, falling to 8.1%.

Non-impact Fire



Engine Bay / Cabin fires were the largest sub-cause (53.1%). Of note was an unusually large proportion of load fires, which caused 11.5% of non-impact fire losses. Compared to no NTI insured large losses due to load fires in 2020 and around 7% of non-impact fires originating with the load in the long term trend.

Fire incidents by sub-cause



Of Engine Bay / Cabin Fires, there was an increase in the proportion of losses due to electrical issues and a decrease in the proportion resulting from mechanical sources.

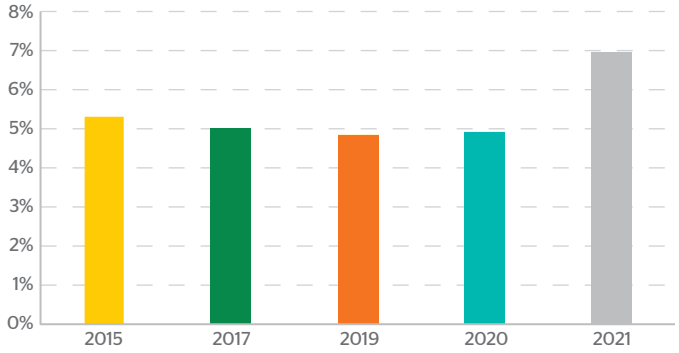
Engine Bay / Cabin Fires by sub-sub-cause

Of wheel end fires, tyres were identified as the source in just under half (46.5%) of incidents, followed by bearings (25%) and brakes (14.3%).

Rolled While Tipping

2021 saw an increase in the proportion of losses in this category, rising from 4.9% in 2020 to 6.9% in 2021.

Rolled while tipping

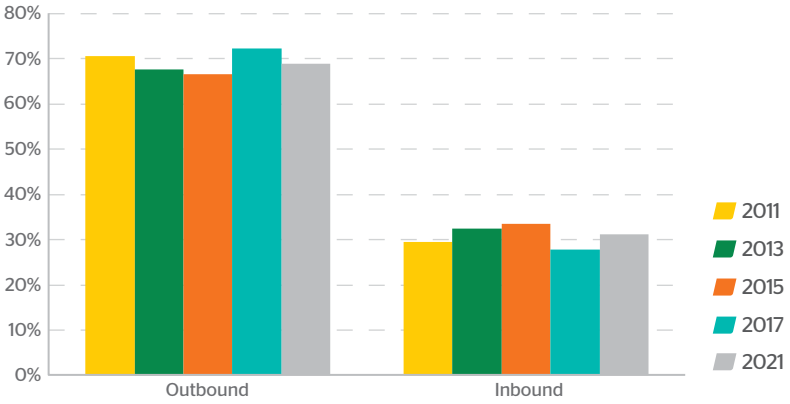


Articulated combinations (as distinct from rigid trucks, with or without trailers) made up 51.6% of rolled while tipping incidents, while no industry data on the split of the freight task between rigid and articulated tippers is available, it would appear likely that semi-trailer end tippers have a higher frequency of Rolled while tipping events.

Direction of Travel

The proportion of losses on the outbound leg remained consistent at around twice that of inbound legs. It is important to note that this may reflect difficulty in defining when a multi-drop journey becomes inbound.

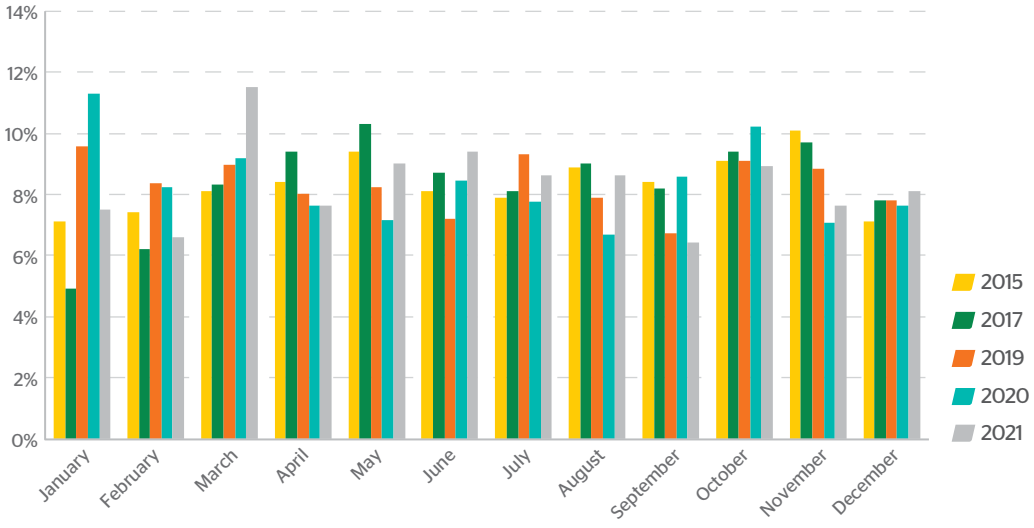
Direction of Travel



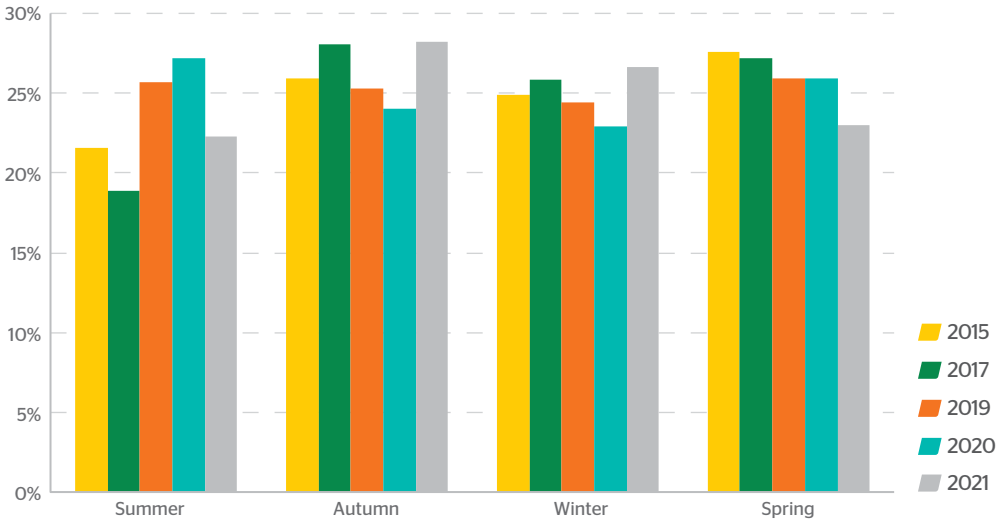
Month / Season

Increased losses were observed in March 2021, contributing to this is a large number of natural peril related losses (1.2% of all losses in 2021) related to 2021 east coast flooding events.

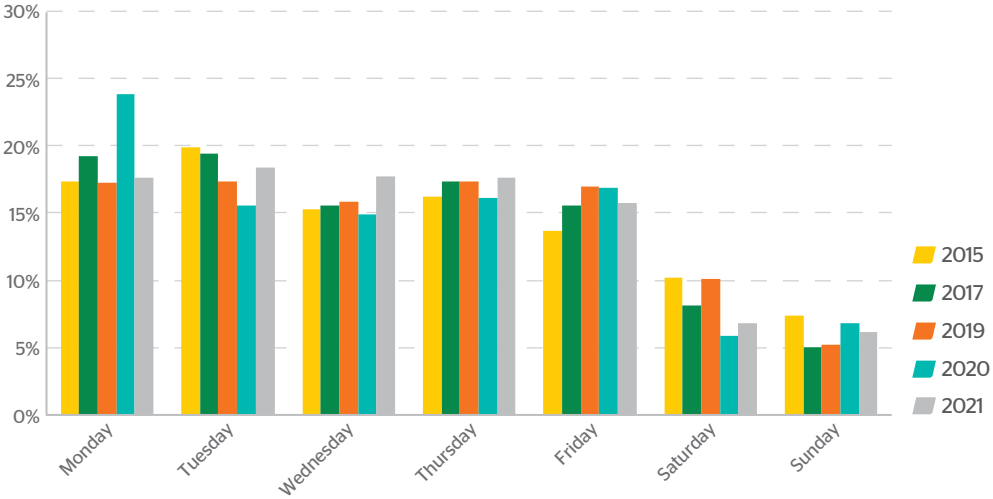
Month of Year



Incident Season

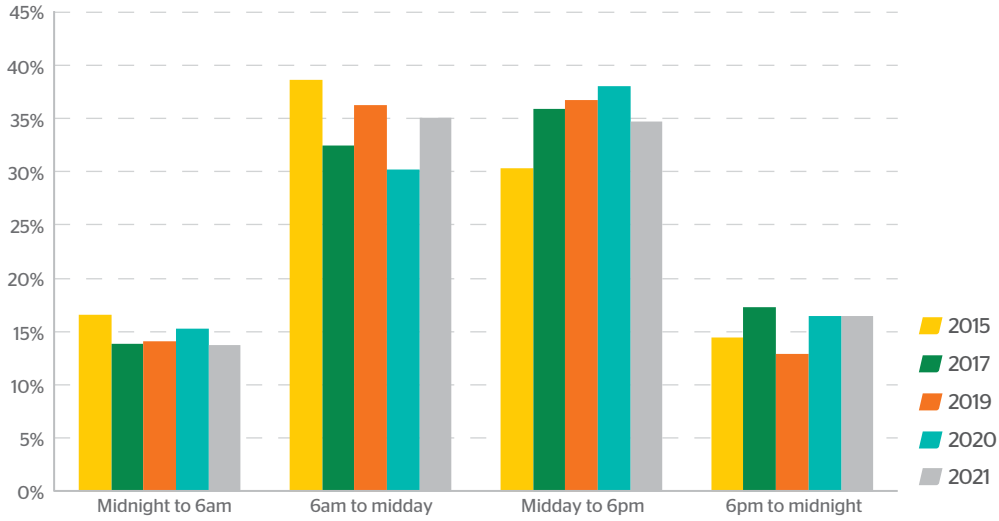


Day of Week



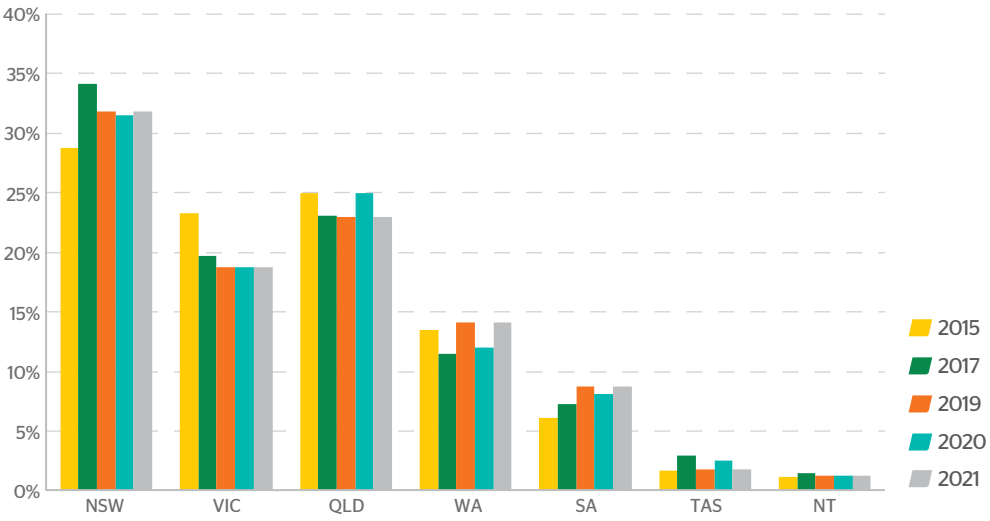
Time of day

Time of Day



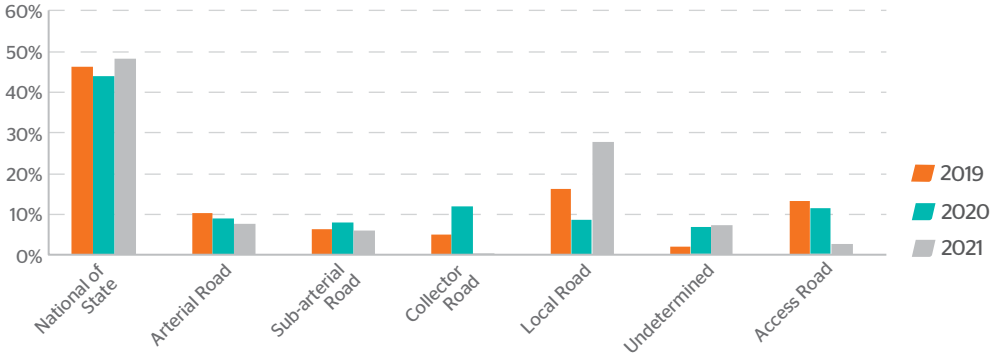
Incident location

Incident State



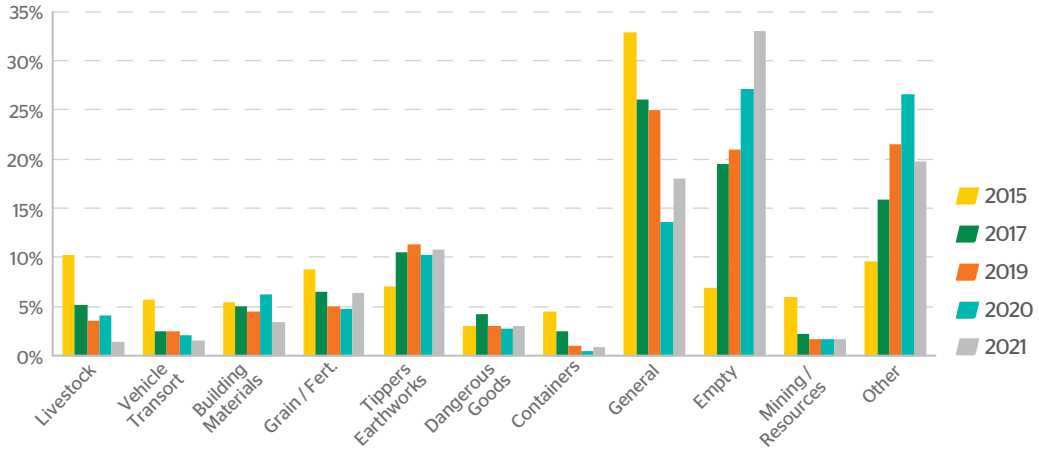
Road Category

Road Category



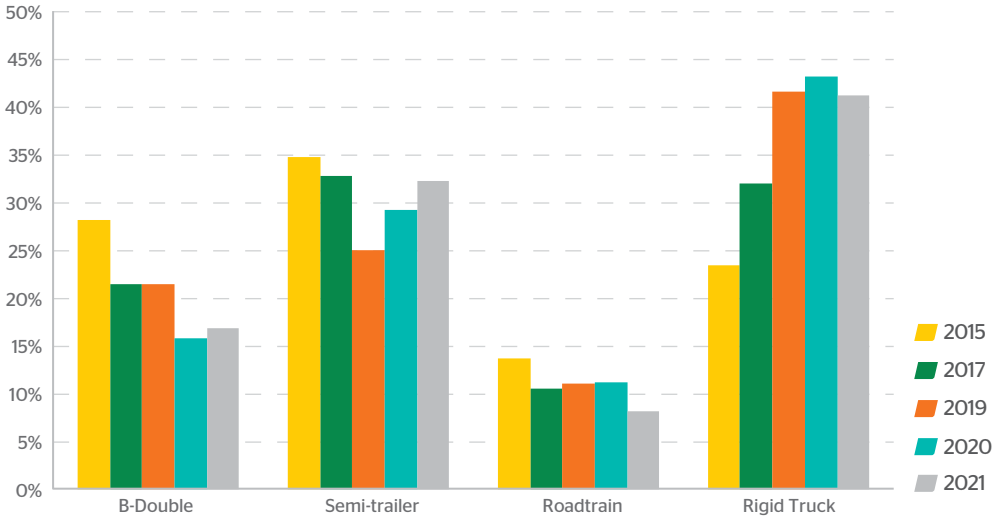
Freight Category

Freight on Board



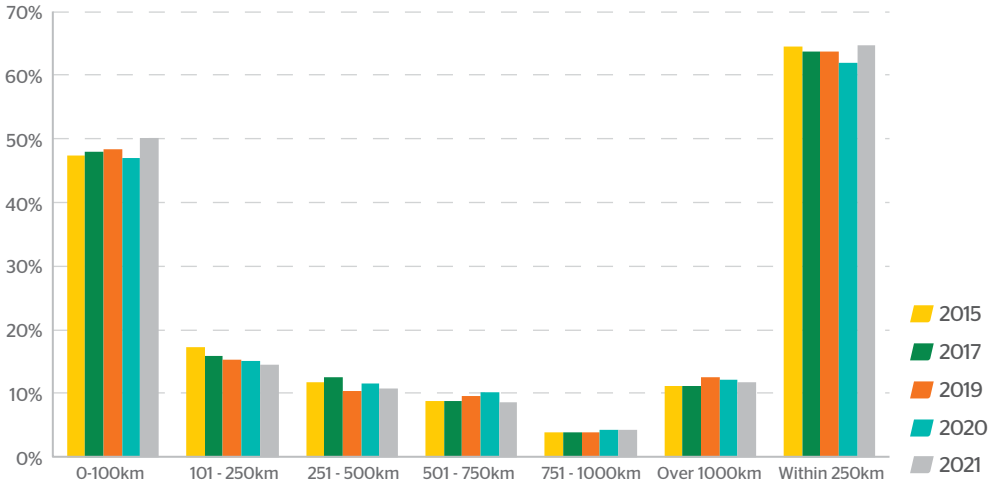
Vehicle Category

Combination Type



Distance from point of departure

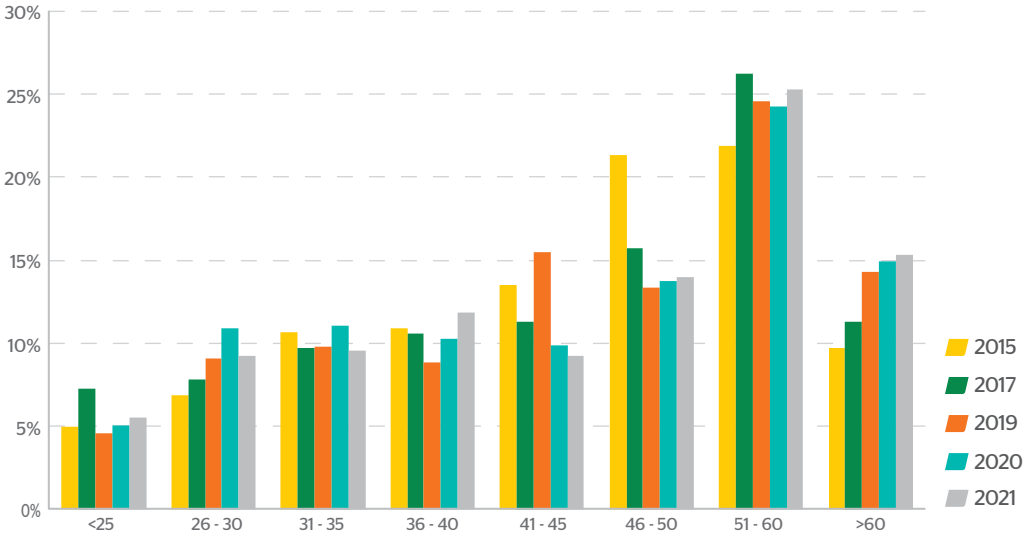
Distance from Base



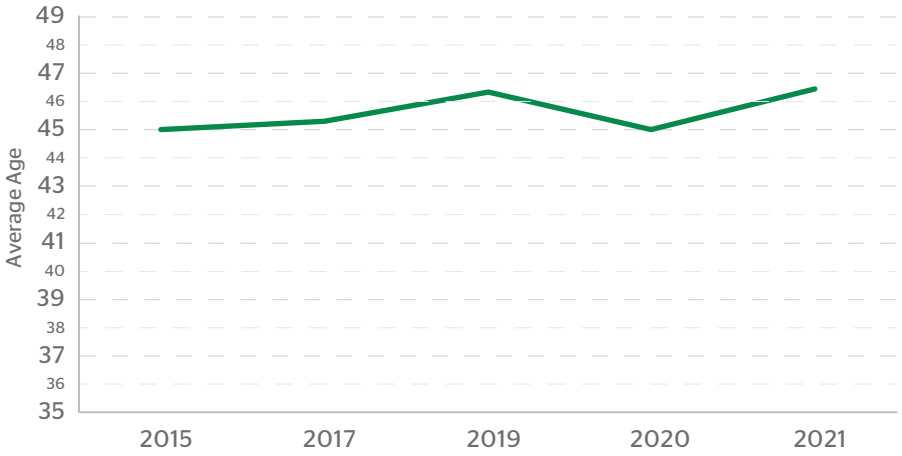
Driver's Age

After a small decrease in 2020, the average age of our insured driver increased to the highest point in this report series at 46.5 years of age.

Driver Age

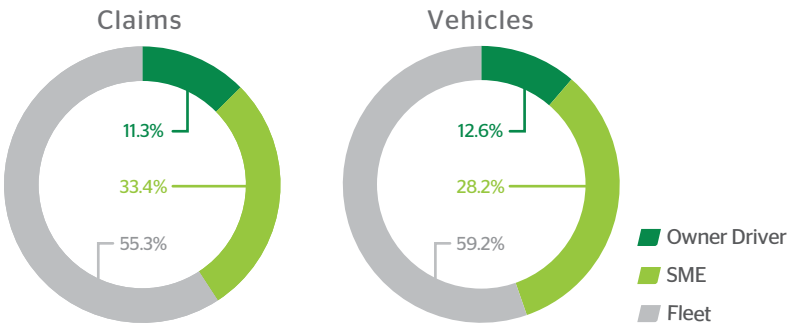


Driver Age



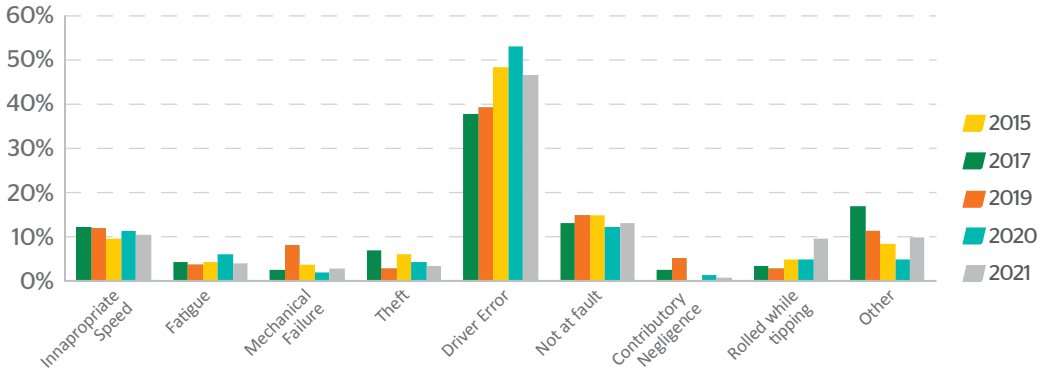
Size of Business

Distribution of losses by Customer Size



Rigid Truck Incidents

Rigid Truck (with or without trailer) losses by Cause



THE AUTHOR

Adam Gibson

Starting his career in the transport and logistics industry as a heavy vehicle consulting engineer, Adam developed a deep interest in not just the how of heavy vehicle regulation, but also the why.

This led to Adam leading the NHVR's Roadworthiness Program which was one of the responses resulting from a spate of serious truck accidents. He then returned to the commercial world taking a role as an Engineer with Penske Commercial vehicles before joining the team at NTI.

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